Novel Method for Gas Separations

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Natural gas has many impurities that must be removed to increase the worth of the natural gas. There are seven major processes that are used to efficiently separate each components of natural gas. Water must first be removed, and then acid gasses must be removed. The third step is the removal of water vapor, then mercury then nitrogen must be rejected from the stream. Finally , methane is separated, and this is the most important aspect of the process. Lastly all of the liquid natural gases ar separated.

The novel process developed has many advantages over the current method used for natural gas processing. First it is much more cost effective than the current method by having reduced operating costs. This process has the potential to have much less of an environmental impact by reducing greenhouse emissions. It can separate most of the contaminants in natural gas, and split each stream such as methane, and ethane into the separate components. The last benefit is that everything can be done using one process just with different stages. Water and mercury are not removed by using this process.

For a fair comparison only the processes that perform the same functions as the novel process were economically compared. We evaluated amine treating, demethanizing, and deethanizing processes have had the economics calculated by using a simulation program, SimSci's ProII. The economics of all of the separated process are compared to the novel process during this report.

There is uncertainty in certain parameters, so three cases were evaluated. The first case is the optimistic view that our parameters are within reasonably practical ranges and render the best economics. The second is the pessimistic view that the parameters are in feasible extremes and they render the worst economics. The last case is the average case, where parameters are between the two extremes. These parameters will be able to be determined from a few experiments that will be conducted at some point in the future. The benefit of this novel method is that all three of these cases result in a lower annualized cost than the current method used. The savings range between 50% to 80% in operating costs. Our fixed capital investment is higher.